speaking, in proportion to the habitual or periodical activity of the animal. 4th. Where it remains as a persistent organ (as in the hybernating tribes), it is one of the general reservoirs for the accumulation of nutritive material.

In further prosecuting the developmental anatomy of his subject, the author next passes in review the maphological history of the true glandular system, with which he contrasts that of the thymus and its analogues, the thyroid, supraenal glands, and the spleen. The principal difference between the two orders of organs appears to consist in the ultimate arrangement of their secreting cells, that of the true glands being distinctly cellular, that of the glands without ducts, consisting of the cytoblast alone, the involving cell-structure being only of exceptional formation. It is a curious fact, however, that in those animals in which the thymus becomes a permanent organ, the nucleus, instead of being simply surrounded by aggregate molecules, as in the temporary state of the organ, is converted into a perfect cell. These different points are rendered plainly intelligible by the plates with which Mr. Simon's work is liberally illustrated.

We now pass on to the most remarkable part of the work, the physiology of the gland. It is thus stated by Mr. Simon:—

"It secretes into a closed cavity certain particular elements of nutrition, which are deposited differently under different circumstances, viz.:—1st. In most animals it occurs only temporarily; the secreted matter then presents itself under a *fluid form*, and closely resembles the liquor sanguinis in ultimate chemical composition. 2d. In some animals, after discharging this temporary function, it assumes one of greater permanency, the sequestration of material in the form of solid fat. In both cases, however, though peculiar, the function is especially the same, and consists in the laying by of nutrient material. How this is used up, Mr. Simon next proceeds to show. Here, however, we are called to notice a certain circumstance which is co-existent with both the temporary and the permanent function of the gland, viz., that in both, *waste of tissue* is at a *minimum*. In the younger animal, muscular activity, which mainly contributes to this waste, has not commenced; in the hybernating animal it is suspended. Now the waste of tissue being at a minimum, the pabulum for the support of the respiratory process must be supplied from some other source."

This source Mr. Simon declares to be the nutritive matter laid up in the central cavity of the thymus as in a reservoir, and he therefore assumes the office of that gland to be that of sequestrating nutritive matter, whereby it becomes "a sinking fund of nourishment in the service of respiration."—*Ibid.*

ORGANIC CHEMISTRY.

11. *On the Chemical Laws that govern secretion.* By Dr. G. J. MULDER.—It is a property of the chemical forces, which are active in any substances, to excite analogous forces in others. We notice this especially in organic nature, and it is nowhere more strikingly illustrated than in the nutrition of animals. Blood, a homogeneous fluid, circulates through very different parts of the body. In the muscles it sustains muscles, in the liver it supplies the component parts of the liver, and from it the gall is there secreted; in the kidneys it maintains their various parts, and secretes the urine, &c. None of these secretions appear in the blood with their peculiar qualities; of some of them not even a trace is found in it. But the four organic elements of the whole are to be found in protein and its combinations, in the colouring matter of the blood, &c. The elements of protein might, no doubt, be transposed in the liver, &c., by means of catalysis, and so the component parts of the liver and gall be produced from it. It would only be necessary, then, that the constituent parts of the liver should be put in contact with the component parts of the blood, and the forces of affinity, resident in the substance of the liver, &c., would not require to influence those in the protein, or to produce any chemical alteration in its component parts.

Other causes, however, ought undoubtedly to be considered. For instance, a change of its component parts takes place in the liver itself, and, from the first, chemical forces actively operate therein. For the continual change of its component parts is a chief characteristic of every living organic substance. These forces may disturb the chemical equilibrium of other substances, and cause the formation of new products. If the constituents of the blood—the combinations of protein, the colouring matter, &c.—enter the liver when it is in a state of action, and are there put in contact with the gall during its secretion, and with the substance of the liver itself, which is in a state of continual alteration, then the result will be, that this change of their component parts having taken place, the action will be transferred to the elements of the blood, and will maintain the secretion. If, on the other hand, the constituents of the blood are in a state of continual change, then the circle of action in which they are involved will extend to the mass of the liver; and so with every organ.

We have, however, no more knowledge of the manner in which this secretion originally commences—whether it proceeds from the blood or from the secreting organ, or whether each of these contributes its part—than with the manner in which the first germ of the whole organ, the liver, is produced, or in which the germ of the animal is converted into an animal. But the continuance of the action —the duration of secretion—entirely corresponds with some other phenomena, which we may observe separately, and which therefore throw light upon these animal actions. This is the case especially with fermentation, from which Liebig has drawn many illustrations, for the purpose of clearly exhibiting his ideas; and with the same view we shall also avail ourselves of the same process.

Yeast changes sugar into carbonic acid and alcohol, and is at the same time changed itself. The latter change causes the former, and is only transferred to the sugar. If we substitute blood for yeast, and the liver for sugar, we may form an idea, more or less, of the secretion of the gall. The component parts of the blood are continually undergoing change. This constant change of the component parts in organic bodies is a chief cause of the continuation of their existence. The liver without intermission assumes new parts and loses others. This process we call nutrition. At the same time that the parts of the blood in the substance of the liver are thus undergoing change, chemical forces are excited; these forces are transferred to the elements of the blood, and so are enabled to produce from them the gall. This takes place the more easily, as the blood itself is also in a state of continual alteration, and thus readily yields to the impulse which, in some way or other, is communicated to it. As the impulse varies, so does the effect. Hence that great diversity in the secretion of very dissimilar substances, which are in a state of alteration, from the same fluid—that is, the blood, which is itself at the same time in a state of decomposition.

From the nutrition of the cellular texture, however, which must be produced from the component parts of blood, and from the nutrition of all the secreting organs—which, besides producing the secretion, maintain themselves by separating what they require from the constituents of blood—we learn that catalysis cannot be left out of consideration in the mere process of nutrition. Further, we must apply the same principle to all the solid parts of the body, which are compounds of protein. The muscles, for instance, have the property of secreting protein from blood, and converting it into fibrin; on the other hand, when protein is deficient in the blood, this fibrin is taken from the muscles and converted into blood-protein, as in diseases of long continuance and in emaciation. Muscles have thus the property of forming muscle-fibrin by simple contact, if protein abounds in the blood, and this result can be ascribed only to a cause similar to that by which crystals gradually accumulate from solutions of salts. It is at least a peculiar action, different from ordinary chemical action, which takes place when the plasma of blood is transformed into muscles, which in composition do not essentially differ from the plasma. The same is the case with the production of hair, nails, and permanent horns.—*The Chemistry of Vegetable and Animal Physiology.*

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12. *The Urine in Bright's Disease of the Kidney.*—By Dr. Schlossberger. After it was observed that albuminous urine accompanied Bright's disease of the kidneys, the presence of *albumen* in the urine was long regarded as pathognomonic of that affection, and its diagnosis was thought to be complete, when albumen showed itself in the urine on the application of heat, or on the addition of mineral